

A Brief Review on Advance Manufacturing Process of Automobile seat Production

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ABSTRACT: For any private and passenger transport vehicle like Car, Bus, Motorcycle, Scooter etc. the main thing which is considered during designing and manufacturing of these vehicles are automotive seat. Persons who travel a long distance, comfort is always desirable for them. So, automotive seat manufacturer companies are taking a very important role for manufacturing of automotive seat which can give maximum level of comfort to the passengers."KRISHNA MARUTI LIMITED" is one of the best automotive seat manufacturer companies which produce comfortable automotive seats and supply them to "MARUTI SUZUKI" car manufacturer company for various models like A-STAR, SX-4, ALTO, SWIFT- D-ZIRE etc. in India (Maruti) and Japan (Suzuki).

The main technology of making these automotive seats is to use of chemicals like POLYOL and ISO-CYANATE and mixed them in a certain ratio(in this work the ratio was taken as 3:7), which varies from model to model of the automotive seats. This job has done automatically with the help of mechanical arms.

MANUFACTURING TECHNIQUES: Three main units for manufacturing the seats were;

1. PU shop, 2. Welding shop, 3. Assembling shop

1. PU SHOP

The full form of PU is POLYURETTEN. PU is the mixture of ISOCYNATE and POLYOL. Firstly the POLYOL is sent to blend-tank automatically and ISO-CYANATE is send to machine-tank manually. The capacity of the machine-tank is 400kg. The agitation of POLYOL took place in the blend-tank. After that the POLYOL is sent from blending tank to machine-tank where it mixed with ISO-CYANATE in the ratio of 3:7. The temperature of the mixture is maintained between 18°C to 28°C.

Now a machine is used having hydraulic device, mechanical arm and control unit. The mixture of POLYOL and ISO-CYANATE is sent to the hydraulic device through pipes which are also known as 'Transferring unit'. After that the mixture of POLYOL and ISO-CYANATE is sent to the mechanical arm. The function of mechanical arm is to pouring the mixture of POLYOL and ISO-CYANATE into the mould. The mechanical arm is operated fully automatically, where the quantity of the mixture which should be pour and the duration of pouring time could be fix by programming in the machine.

Before pouring, the mould is heated upto 56°C-66°C. The chemical mixture is poured in the mould after placing a wire frame in the mould. After pouring the chemical mixture, the rising of it takes place gradually.

The pouring of the material took place according to the hardness and density required of the seats. Total time taken to manufacture of one set of seat was 5 minutes and time required for the removal and cleaning of the unit was 3 minutes. RI spray was used to clean the unit. Therefore for completion of one cycle for one set of seat, the total time required was 8 minutes and 432 car seats were manufactured per batch. After checking the Code and quality of the seats they were sent to welding shop.

2. WELDING SHOP

In this shop, firstly spot welding operation of bracket has done. After that MIG welding operation of bracket from back hinge was performed. Then crimping operation of frame component has done. After that spot & MIG welding operations for frame component and lifter has done. Then tightening operation is performed. Finally, spring crimping has done.

MIG welding was used for the manufacturing of the seats base. Mild steel wire of diameter 0.8, 1.0 and 1.2 mm were used as filling material during welding and Argon gas was

used as inert gas in MIG welding process. The material of consumable wire was formed by copper coating on mild steel. The robotic arm could weld of 6 units at one time and each unit was placed at gapping of 60°.

3. ASSEMBLY SHOP

The final stage of operation was done in the Assembly shop. Total 450 seats were assembled per batch. M-8 and M-10 bolts were used in the assembly process. The machine which could fix the bolts was sensor based. The conveyor belt does not move further if the assembly operation is improper or not completed.



Fig1, Different types of Automobile seats after assembly in assembly shop

The driver and co-driver seats were assembled on same conveyor belt and the back seats were assembled on different conveyor belt. Hot water was used for cleaning purpose after assembly. Assembled seats are also exported to Europe countries.

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